

WHAT IS CLAIMED IS:

1. An image reproduction apparatus, comprising:

storage means for storing a plurality of partial images obtained by dividing an entire image by a

5 predetermined field of view for each of a plurality of entire images corresponding to a plurality of view points, the entire image having a field of view wider than a display field of view of an image displayed on display means;

10 selection means for selecting any of the partial images stored in said storage means based on information about a position and a direction of a viewpoint, and the display field of view of the image displayed on the display means; and

15 generation means for generating an image corresponding to the position and the direction of a viewpoint from the selected partial image, and providing the generated image for the display means.

20 2. The apparatus according to claim 1, wherein, each of the entire images is panoramic image, and

when a plurality of partial images are selected by said selection means, said generation means generates the image to be displayed on said display means by
25 extracting an image corresponding to the position and the direction of a viewpoint from an image obtained by combining the partial images.

3. The apparatus according to claim 1, wherein
said storage means stores partial images obtained
by dividing an entire image such that adjacent partial
5 images share overlapping portions.

4. The apparatus according to claim 3, wherein
a field of view of the partial image doubles the
display field of view, and the whole of the partial
10 image is overlapped by adjacent partial images thereof.

5. The apparatus according to claim 1, wherein
said storage means stores each partial image in an
independent file.
15

6. The apparatus according to claim 5, wherein:
said position of a viewpoint moves along a road on
a map; and
said apparatus further comprises read means for
20 determining a file next required based on the road
containing the position of the viewpoint and the moving
direction before the viewpoint position information is
input.

25 7. The apparatus according to claim 1, wherein:
said storage means stores $m \times n$ partial images
obtained by n entire images each comprising m partial

images, and header information indicating a start position of each of the $m \times n$ partial images in one file; and

said selection means determines a file containing
5 an entire image corresponding to the viewpoint position information, determines a partial image to be used by said generation means based on the viewpoint direction information and the display field of view, and obtains a partial image to be provided according to the header
10 information.

8. The apparatus according to claim 7, wherein
said position of a viewpoint moves along a road on a map; and
15 said apparatus further comprises read means for determining a file next required based on the road containing the position of the viewpoint and the moving direction before the viewpoint position information is input.

20
9. The apparatus according to claim 1, wherein
said storage means compresses and stores each partial image.

25 10. The apparatus according to claim 1, wherein
said storage means stores each partial image as a 90° rotated image.

11. An image reproducing method, comprising the steps of:

storing in storage means a panoramic image as
5 partial images obtained by dividing an entire image by
a predetermined field of view for each of a plurality
of entire images corresponding to a plurality of view
points, the entire image having a field of view wider
than a display field of view of an image displayed on
10 display means;
selecting any of the partial images stored in said
storage means based on information about a position and
a direction of a viewpoint, and the display field of
view of the image displayed on the display means; and
15 generating an image corresponding to the position
and the direction of a viewpoint from the selected
partial image, and providing the generated image for
the display means.

20 12. The method according to claim 11, wherein, each of
the entire images is a panoramic image, and

when a plurality of partial images are selected in
said selecting step, said generating step extracts an
image corresponding to the position and the direction
25 of a viewpoint from an image obtained by combining the
partial images.

13. The method according to claim 11, wherein
said storing step stores partial images obtained
by dividing an entire image such that adjacent partial
images share overlapping portions.
- 5
14. The method according to claim 13, wherein
a field of view of the partial image doubles the
display field of view, and adjacent partial images
necessarily have overlapping portions.
- 10
15. The method according to claim 11, wherein
said storing step stores each partial image in an
independent file.
- 15
16. The method according to claim 15, wherein:
said position of a viewpoint moves along a road on
a map; and
said apparatus further comprises a reading step of
determining a file next required based on the road
20 containing the position of the viewpoint and the moving
direction before the viewpoint position information is
input.
- 25
17. The apparatus according to claim 11, wherein:
said storing step stores $m \times n$ partial images
obtained by n entire images each comprising m partial
images, and header information indicating a start

position of each of the $m \times n$ partial images in one file; and

said selecting step determines a file containing an entire image corresponding to the viewpoint position
5 information, determines a partial image to be used in said generating step based on the viewpoint direction information and the display field of view, and obtains a partial image to be provided according to the header information.

10 18. The method according to claim 17, wherein
said position of a viewpoint moves along a road on a map; and

said apparatus further comprises a read step of
15 determining a file next required based on the road containing the position of the viewpoint and the moving direction before the viewpoint position information is input.

20 19. The method according to claim 11, wherein
said storing step compresses and stores each partial image.

25 20. The method according to claim 11, wherein
said storing step stores each partial image as a 90° rotated image.

21. An image processing apparatus, comprising:
division means for dividing an image having a
predetermined field of view into a plurality of partial
images;

5 compression means for compressing each of the
partial images divided by said division means;

storage means for adding position information to
each of the partial images compressed by said
compression means and storing the image;

10 input means for inputting position information;
and

decoding means for reading a corresponding partial
image from said storage means according to the input
information input by said input means, and decoding the
15 image.

22. The apparatus according to claim 21, wherein
said division means is designed to divide a
panoramic image into a plurality of field of view.

20

23. The apparatus according to claim 22, wherein:

said input means inputs the position information
and field of view information, and said decoding means
compares the position information and the field of view
25 information with position information stored in said
storage means, thereby reading and decoding partial
images corresponding to the position and the field of

view input by said input means.

24. The apparatus according to claim 23, further comprising

5 image combining means for combining a plurality of images when there are a plurality of images decoded by said decoding means.

25. The apparatus according to claim 24, wherein
10 a plurality of partial image stored in said storage means share overlapping portions with each other.

26. The apparatus according to claim 21, wherein
15 said position information about partial images stored in said storage means is linked to the position information on a map, and said input means can input the position and the viewpoint direction on the map.

20 27. An image processing method, comprising the steps of:

dividing an image having a predetermined field of view into a plurality of partial images;

compressing each of the partial images divided in
25 said dividing step;

adding position information to each of partial images compressed in said compressing step, and storing

the image;

inputting position information; and

reading a corresponding partial image from said
storage means according to the input information input
5 by said inputting step, and decoding the image.

28. The method according to claim 27, wherein

said diving step is designed to divide a panoramic
image into a plurality of field of view.

10

29. The method according to claim 28, wherein:

said inputting step inputs the position
information and field of view information, and said
decoding step compares the position information and the
15 field of view information with position information
stored in said storing step, thereby reading and
decoding partial images corresponding to the position
and the field of view input in said inputting step.

20 30. The method according to claim 29, further
comprising

image combining step of combining a plurality of
images when there are a plurality of images decoded in
said decoding step.

25

31. The method according to claim 30, wherein
a plurality of partial image stored in said

storing step share overlapping portions with each other.

32. The method according to claim 27, wherein

 said position information about partial images
5 stored in said storing step is linked to the position
information on a map, and said inputting step can input
the position and the viewpoint direction on the map.

33. A computer-executable program, comprising:

10 a code of storing in storage means a plurality of
partial images obtained by dividing an entire image by
a predetermined field of view for each of a plurality
of entire images corresponding to a plurality of view
points, the entire image having a field of view wider
15 than a display field of view of an image displayed on
display means;

 a code of selecting any of the partial images
stored in said storage means based on information about
a position and a direction of a viewpoint, and the
20 display field of view of the image displayed on the
display means; and

 a code of generating an image corresponding to the
position and the direction of a viewpoint from the
selected partial image, and providing the generated
25 image for the display means.

34. A computer-executable program, comprising:

a code of dividing an image having a predetermined field of view into a plurality of partial images;

a code of compressing each of the partial images divided in said dividing step;

5 a code of adding position information to each of partial images compressed in said compressing step, and storing the image;

a code of inputting position information; and

10 a code of reading a corresponding partial image from said storage means according to the input information input by said inputting step, and decoding the image.

35. A storage medium storing a computer-executable control program, said control program comprising:

15 a code of storing in storage means a plurality of partial images obtained by dividing an entire image by a predetermined field of view for each of a plurality of entire images corresponding to a plurality of view
20 points, the entire image having a field of view wider than a display field of view of an image displayed on display means;

a code of selecting any of the partial images stored in said storage means based on information about
25 a position and a direction of a viewpoint, and the display field of view of the image displayed on the display means; and

a code of generating an image corresponding to the position and the direction of a viewpoint from the selected partial image, and providing the generated image for the display means.

5

36. A storage medium storing a computer-executable control program, said control program comprising:

- a code of dividing an image having a predetermined field of view into a plurality of partial images;
- 10 a code of compressing each of the partial images divided in said dividing step;
- a code of adding position information to each of partial images compressed in said compressing step, and storing the image;
- 15 a code of inputting position information; and
- a code of reading a corresponding partial image from said storage means according to the input information input by said inputting step, and decoding the image.

20